REMARKS

The Office Action dated April 29, 2008, has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

By this Submission, claim 1 has been amended to more particularly point out and distinctly claim the subject matter of the present invention. No new matter has been added and no new issues are raised which require further consideration and/or search. Accordingly, claims 1-13 and 26-27 are currently pending, of which claims 1 and 27 are independent claims. Applicants request entry of the above amendments because the above amendments place the claims in better condition for allowance.

Applicants thank the Examiner for indicating the allowability of claim 27.

In view of the above amendments and the following remarks, Applicants respectfully request reconsideration and timely withdrawal of the pending rejections to the claims for the reasons discussed below.

Claim Rejections under 35 U.S.C. §103(a)

Claims 1-2 and 26

The Office Action rejected claims 1-2 and 26 under 35 U.S.C. §103(a) as being allegedly unpatentable over Coxon, *et al.* (U.S. Patent No. 6,104,029) ("Coxon"). Applicants respectfully submit that the claims recite subject matter that is neither disclosed nor suggested in the teachings of Coxon.

Claim 1, upon which claims 2-13 and 26 are dependent, recites a charged particle spectrometer. The charged particle spectrometer is operable in a first mode using a hemispherical analyser to produce an energy spectrum relating to the composition of a sample being analysed. The charged particle spectrometer is also operable in a second mode using a spherical mirror analyser to produce a two-dimensional charged particle image of the surface of the sample being analysed. The charged particle spectrometer includes a detector which is used to detect charged particles produced in both modes of operation.

As will be discussed below, Coxon fails to disclose or suggest every claim feature recited in claims 1-2 and 26, and therefore fails to provide the features of the claims discussed above.

Coxon is directed to a spectrometer and method of spectroscopy provided for surface analysis. The spectrometer includes an energy analyzer for analyzing the energies of charged particles liberated from a sample, a lens arranged to project a diffraction image of the analysis area at the image plane of the lens and a detector for detecting the charged particles. The analyzer and lens are arranged to generate an image at the detector in which the charged particles are distributed along a first direction according to their emission angles and are distributed along another direction according to their energies. The detector is arranged to detect the distribution of charged particles in the image along the first direction to provide angle resolved energy spectra (Coxon, Abstract; col. 4, line 61, to col. 6, line 29).

Applicants respectfully submit that Coxon fails to disclose or suggest every feature recited in claim 1. Specifically, Coxon fails to disclose or suggest, at least, "a second mode using a spherical mirror analyser to produce a two-dimensional charged particle image of the surface of the sample being analysed, wherein the spectrometer includes a detector which is used to detect charged particles produced in both modes of operation" as recited in claim 1 (emphasis added).

Applicants respectfully submit that the electron optical arrangement disclosed in Coxon is not capable of producing a real two-dimensional image of the spatial distribution of material on the sample surface 17 upon the detector 65.

In Coxon, objective lens 13 includes a cylindrical electrode 21, which produces a "first real image," as illustrated in Figures 1 and 2. In this image, two-dimensional information about the spatial distribution of surface atoms of the sample is retained. The objective lens 13 including cylindrical electrode 21, however, is not a spherical mirro analyzer. Additionally, through the second lens 19, which includes three axially-spaced cylindrical electrode sections 39, 41, and 43, spatial information about the sample is only retained in the plane of Figure 1 in the "second real image," a one-dimensional image of the sample surface at the input to the hemispherical analyzer along the dispersive direction of the analyzer.

In Figure 2, in the orthogonal, non-dispersive plane, the quadruple lens forms a "diffraction image" onto the object plane 7 along the non-dispersive direction of the hemispherical energy analyser 5. Spatial information about the position of the

origination of the electron on the sample surface is lost. Accordingly, the electron position on the object plane 7 only contains information about one coordinate of the electron's starting position on the sample. Therefore, *a 2-dimensional image of the sample surface is not formed at the position labeled as the "second real image."*

Even for the one-dimensional image in the dispersive direction, the spatial information from the sample surface is not preserved at the detector 65 because, as is well known for hemispherical analyzers, object points at their entrance are imaged to diametrically opposite positions at their exit dependent on a convolution of the starting position at the analyzer entrance and the energy of the electron. Hence, the spatial information from the sample is not preserved at the detector 65.

Furthermore, in the plane of Figure 1, the hemispherical energy analyzer 5 forms an energy dispersed spectrum on detector 65 from each point in the "second real image," e.g. the landing position on the detector 65 depends predominantly on the energy of the electron rather than its position in the second image plane. The position of the electron on the detector 65 does not depend on the point of origin on the sample 17. In the orthogonal plane of Figure 2, the position of the electron in the "diffraction image" is retained at the detector 65, but as discussed above, no information about the point of origin on the sample 17 is present.

Therefore, at the detector 65, information about the spatial origin of electrons from the sample 17 is not retained. Accordingly, Coxon fails to disclose or suggest, at least, "second mode using a spherical mirror analyser to produce a <u>two-dimensional</u> charged

particle image of the surface of the sample being analysed, wherein the spectrometer includes a detector which is used to detect charged particles produced in both modes of operation" as recited in claim 1 (emphasis added).

Accordingly, Coxon fails to disclose or suggest every feature recited in claim 1. Claims 2 and 26 depend from claim 1. Accordingly, claims 2 and 26 should be allowable for at least their dependency upon an allowable base claim, and for the specific limitations recited therein.

Therefore, Applicants respectfully request withdrawal of the rejections of claims 1-2 and 26 under 35 U.S.C. §103(a) and respectfully submit that claim 1, and the claims that depend therefrom, are now in condition for allowance.

Claims 3-4

The Office Action rejected claims 3-4 under 35 U.S.C. §103(a) as being allegedly unpatentable over Coxon in view of Faris, *et al.* (U.S. Patent No. 5,265,327) ("Faris"). Applicants respectfully submit that the claims recite subject matter that is neither disclosed nor suggested in the combination of Coxon and Faris.

Coxon was discussed above. Faris is directed to a process for fabricating microchannel plates which produces large area microchannel plates that have channel exit openings as small as 0.5 micron, MTF ~1, pitch-limited resolution, and a cost of $0.40/sq. centimeter (Faris, Abstract).

As previously noted above, Coxon fails to disclose or suggest every feature recited in claim 1. Faris fails to cure the deficiencies of Coxon. Specifically, Faris fails to disclose or suggest, at least, "a second mode using a spherical mirror analyser to produce a two-dimensional charged particle image of the surface of the sample being analysed, wherein the spectrometer includes a detector which is used to detect charged particles produced in both modes of operation" as recited in claim 1 (emphasis added). Accordingly, Coxon in view of Faris fails to disclose or suggest every feature recited in claim 1.

Claims 3-4 depend from claim 1. Accordingly, claims 3-4 should be allowable for at least their dependency upon an allowable base claim, and for the specific limitations recited therein.

Therefore, Applicants respectfully request withdrawal of the rejections of claims 3-4 under 35 U.S.C. §103(a) and respectfully submit that claim 1, and the claims that depend therefrom, are now in condition for allowance.

Claims 5-12

The Office Action rejected claims 5-12 under 35 U.S.C. §103(a) as being allegedly unpatentable over Coxon in view of Faris, and further in view of Wollnik, *et al.* (U.S. Patent No. 5,644,128) ("Wollnik"). Applicants respectfully submit that the claims recite subject matter that is neither disclosed nor suggested in the combination of Coxon, Faris, and Wollnik.

Coxon and Faris were discussed above. Wollnik is directed to a position sensitive fast timing detector for determining time-of-flight mass analysis and position of atomic particles. The detector includes a channel plate assembly for detecting the impact of one or more atomic particles transforming them into one or more electron clouds (Wollnik, Abstract).

As previously noted above, Coxon in view of Faris fails to disclose or suggest every feature recited in claim 1. Wollnik fails to cure the deficiencies of Coxon and Faris. Specifically, Wollnik fails to disclose or suggest, at least, "a second mode using a spherical mirror analyser to produce a two-dimensional charged particle image of the surface of the sample being analysed, wherein the spectrometer includes a detector which is used to detect charged particles produced in both modes of operation" as recited in claim 1 (emphasis added). Accordingly, Coxon in view of Faris, and further in view of Wollnik, fails to disclose or suggest every feature recited in claim 1.

Claims 5-12 depend from claim 1. Accordingly, claims 5-12 should be allowable for at least their dependency upon an allowable base claim, and for the specific limitations recited therein.

Therefore, Applicants respectfully request withdrawal of the rejections of claims 5-12 under 35 U.S.C. §103(a) and respectfully submit that claim 1, and the claims that depend therefrom, are now in condition for allowance.

Claim 13

The Office Action rejected claim 13 under 35 U.S.C. §103(a) as being allegedly unpatentable over Coxon in view of Faris and Wollnik, and further in view of Abshire (U.S. Patent No. 5,566,139) ("Abshire"). Applicants respectfully submit that the claims recite subject matter that is neither disclosed nor suggested in the combination of Coxon, Faris, Wollnik, and Abshire.

Coxon, Faris, and Wollnik were discussed above. Abshire is directed to a time interval unit which operates in accordance with electronic sampling techniques and employing a pair of identical sampling interpolators which are respectively triggered at the start and stop of the time interval to be measured. Each time interval unit includes a GHz frequency sinusoidal clock signal generator and a time counter in the form of a pulse counter and a pair of sampling type interpolators which are respectively triggered on in response to a start and stop signal. When triggered, each interpolator samples the instantaneous amplitude of the in-phase(x) and quadrature(y) components of the sinusoidal clock signal. From the samples of the x and y components and the pulse counter's result, the elapsed time between two events is computed to a psec accuracy (Abshire, Abstract).

As previously noted above, Coxon in view of Faris and Wollnik fails to disclose or suggest every feature recited in claim 1. Abshire fails to cure the deficiencies of Coxon, Faris, and Wollnik. Specifically, Abshire fails to disclose or suggest, at least, "a second mode using a spherical mirror analyser to produce a <u>two-dimensional</u> charged particle

image of the surface of the sample being analysed, wherein the spectrometer includes a detector which is used to detect charged particles produced in both modes of operation" as recited in claim 1 (emphasis added). Accordingly, Coxon in view of Faris and Wollnik, and further in view of Abshire, fails to disclose or suggest every feature recited in claim 1.

Claim 13 depends from claim 1. Accordingly, claim 13 should be allowable for at least its dependency upon an allowable base claim, and for the specific limitations recited therein.

Therefore, Applicants respectfully request withdrawal of the rejection of claim 13 under 35 U.S.C. §103(a), and respectfully submit that claim 1, and the claims that depend therefrom, are now in condition for allowance.

CONCLUSION

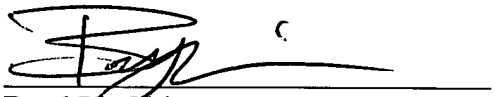
In conclusion, Applicants respectfully submit that Coxon, Faris, Wollnik, and Abshire, alone or in combination, fail to disclose or suggest every feature recited in claims 1-13 and 26-27. The distinctions previously noted are more than sufficient to render the claimed invention unanticipated and non-obvious. It is therefore respectfully requested that all of claims 1-13 and 26-27 be allowed, and this present application be passed to issuance.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by

telephone, Applicants' undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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Enclosures: Request for Continued Examination (RCE) Transmittal
Petition for Extension of Time
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